REMARKS/ARGUMENTS

Claims 1-22 are pending.

Claim 1 is rejected under 35 U.S.C. §103 (a) as being unpatentable over Yanagisawa et al. (USP 6,259,198) taken with Moriyama (USP 5,479,188).

Claim 2 is rejected under 35 U.S.C. §103 (a) as being unpatentable over Yanagisawa et al. taken with Moriyama as applied to claim 1 in item 3 hereinabove, and further in view of Kim (USP 6,154,187).

Claims 3-5 are rejected under 35 U.S.C. §103 (a) as being unpatentable over Yanagisawa et al. taken with Moriyama as applied to claim 1 in item 3 herein above, and further in view of Huang et al. (Pub. No. US 2002/0036602) taken with Takahashi et al. (Pub. No. US 2003/0011551).

Claim 22 is rejected under 35 U.S.C. §103 (a) as being unpatentable over Yanagisawa et all. taken with Moriyama in view of Huang et al. taken with Takahashi et al as applied to claim 5 in item 5 herein above, and further in view of Abe et al. (Pub. No. 2003/0016189).

It is noted with appreciation that claims 6-21 are allowed.

Claim Amendments

Independent claims 1, 3, and 5 have been amended to more clearly distinguish over the cited art. No new matter has been added. See for example, Fig. 3 and the discussion presented in the specification from page 14, line 17 to page 15, line 14.

Cosmetic amendments were made to improve readability. For example, in claim 3, line breaks and indentation were added in the next to last wherein clause to more clearly set out the elements of the clause.

The Present Invention

An aspect of the present invention is that the select period for selecting at least one row of specific electron emission devices among plural electron emission devices is divided into plural sub-periods, and in each of the sub-periods a respective driving voltage is applied to the electron emission devices. Further, at least one of the driving voltage has a gray-scale level

corresponding to a level of an input video signal. Consequently, a multiple gray-scale display can be operated to display a number of gray-scale levels that exceeds the number of gray-scale levels of the driving voltage. For example, if the gray-scale level of the driving voltage is 256 levels, and the select period is divided into two sub-periods, an image can be displayed with approximately 256×2 gray-scale levels.

Rejection of Claim 1

Yanagisawa discloses an electron emission type flat panel display apparatus comprising the back substrate, the front substrate, the scanning electrodes, the signal electrodes and the electron emission devices. However, as indicated in the Office action, Yanagisawa does not show any structure for dividing at least one row of select period into plural sub-periods nor any structure for applying the driving voltage to the electron emission devices in each of the sub-periods respectively.

Moriyama was cited. However, in column 7, lines 11-26, a liquid crystal display driving method using the four-frame thinning out system is described. The method includes applying a pair of positive and negative voltages for each one reference gradation level. The description does not teach "said select period being divided into a plurality of sub-periods, wherein each of said driving voltages is applied in each of said sub-periods and at least one of said driving voltages has a gray-scale level corresponding to a level of said input video signal" as recited in claim 1.

In the four-frame thinning out driving system described by Moriyama, four continuous frames forms one cycle and four different voltages are applied to four (2×2) pixels corresponding to each of the frames (refer Figs. 6-8). The voltages applied to four (2×2) pixels, as shown in Figs. 4 and 9 of Moriyama, have only two level voltages: high voltage and low voltage. That is, the technology of Moriyama forms a intermediate gradation by making the pattern of the voltages applied to four (2×2) pixels differ in each frame. As can be seen in Figs. 4 and 9, the voltage of four different levels is applied to the pixel(s), because a liquid crystal display is driven with an alternating current driving in order that the direct current component isn't applied to the liquid crystal for a long period of time as described in column 1 line 63 through column 2 line 14, in which substantially two level voltages of high voltage and low

voltage are applied. Consequently, the voltage applied to the liquid crystal does not have a gray-scale (gradation) level corresponding to the level of an input video signal, as recited above.

By contrast, as recited in claim 1, the select period which selects at least one row of specific electron emission devices is divided into a plurality of sub-periods and a driving voltage having a gray-scale (gradation) level corresponding to the level of an input video signal is applied in each of the sub-periods. In other words, the driving voltage applied to in each sub-period does not have only two voltage levels, rather it comprises plural voltage levels corresponding to the level of an input video signal. In this way, a display apparatus in the present invention can produce a gray-scale display with a number of gray-scale levels that exceeds the number of gray-scale levels of the driving voltage. For example, the value is equal to the product of the number of the sub-periods and the gray-scale level of the driving voltage.

The Section 103 rejections of claim 1 and 2 are believed to be overcome.

Rejection of Claims 3 and 5

Huang discloses the driving technology of PDP like Kim and doesn't refer to the driving technology of FED or SED. In Huang et al, as described in the paragraphs numbered 0006 through 0017 and Figs. 2-4, the gray-scale display is formed by dividing one frame (field) into plural sub-field, changing the number of the discharge pulses in sustain period in each sub-field and writing data of ON/OFF of a cell.

By contrast, claims 3 and 5 recite in part, the select period which selects at least one row of specific electron emission devices is divided into a plurality of sub-periods and a driving voltage having a gray-scale (gradation) level corresponding to the level of an input video signal is applied in each of the sub-periods and the picture display with the gray-scale level corresponding to the gray-scale level determined by the driving voltage an to the number of the divided sub-periods is made possible. This structure is nowhere discussed in Huang.

Further, in Takahashi, the liquid crystal display device varies the gradation number (level) of the picture by pulse-width-modulation and the select period is divided into plural sub-periods, in which the number of the divided sub-periods is equal to the gradation number (level) plus one, that is, for example, in case the gradation number is 16, the select period is divided into 17 sub-periods, and the voltage for white display or black display is

applied in each of the sub-periods (refer paragraph 0037, 0038, 0043 and Fig. 3). However, the voltage applied in each of the sub-periods has only two voltage levels of white level and black level and does not have a level according to the input video signal. Hence, in this technology of Takahashi, it is impossible to display a gradation more than the number of the divided sub-periods.

By contrast, in claims 3 and 5, the select period which selects at least one row of specific electron emission devices is divided into a plurality of sub-periods and a driving voltage having a gray-scale (gradation) level corresponding to the level of an input video signal is applied in each of the sub-periods and the picture display with the gray-scale level corresponding to the gray-scale level determined by the driving voltage an to the number of the divided sub-periods is made possible. This structure is nowhere in Takahashi.

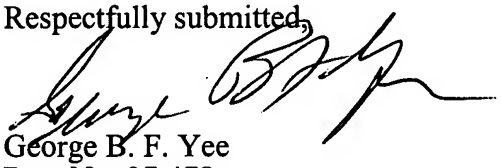
The Section 103 rejection of claims 3 and 5 is believed to be overcome.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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